March 8, 1966 J. WALLBOM 3,238,607

RAPID LATHING STEEL FOR GROOVE LATHING

Filed Dec. 26, 1963 2 Sheets-Sheet 1

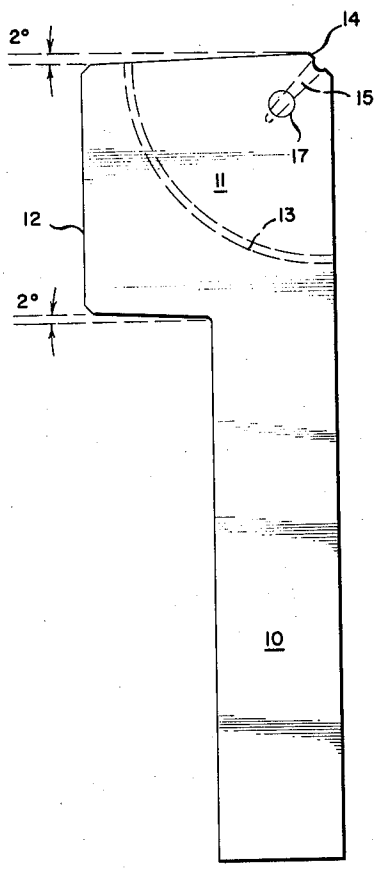


FIG. 1

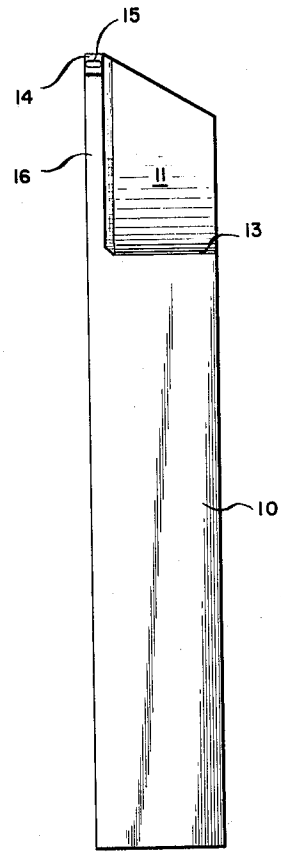


FIG. 2

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RAPID LATHING STEEL FOR GROOVE LATHING

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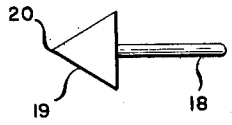


FIG. 3

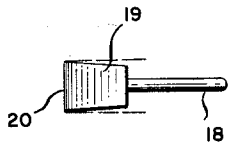


FIG. 4

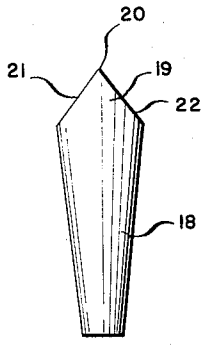


FIG. 5

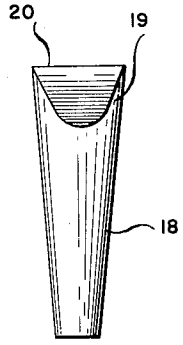


FIG. 6

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3,238,607

RAPID LATHING STEEL FOR GROOVE LATHING

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6 Claims. (Cl. 29—96)

In groove turning or cutting in shafts or the like usually high speed cutting elements are used. These high speed cutting elements incorporate exceptionally hard materials often in the form of alloys but still more often in the form of carbides which in certain cases do not contain any steel but exclusively other metals. These high speed materials are very expensive, and in order to decrease the consumption of such materials several arrangements have been proposed whereby generally one divides the cutting element into a holder of a cheaper material, which may be of normal carbon steel but as a rule is made of an alloy hard steel, on the one hand, and the material of the cutting bit or tip, on the other hand, whereby the overall cutting element is so made that it contains a minimum quantity of the expensive high speed material.

In such tools, composed of a holder and a bit or tip, one desires amongst others the following properties: The bit or tip should, as already mentioned have a minimum total volume and dimension in order to avoid high costs. It should be possible to grind the bit anew after it has been worn out the first time. The bit should be easy to fix to the holder, and the fixture should be selfadjusting, which means that the bit or tip should, when used, naturally assume the position, in which its cutting edge is in correct position relative to the working piece, simultaneously as the steel assumes a more rigid position in the holder. Finally the steel should be easily removed from the holder for changing it or grinding it anew.

The present invention refers to a high speed cutting element comprising a cutting bit or tip and holder which satisfy the above mentioned requirements. One form of execution of this high speed bit with its holder is described below in connection with the attached drawings, in which FIG. 1 shows the holder from the side, whereas FIG. 2 shows the holder from above. FIG. 3 shows the bit or tip in enlarged scale from the same side from which the holder is shown in FIG. 1, and FIG. 4 shows the same bit seen from below in a direction, perpendicular to its shaft. FIGS. 5 and 6 show a modified bit, in the same views as in FIG. 3 and FIG. 4, respectively.

In the usual way the holder is formed by a shaft part **10** and a bit holder part or main body part **11**. The shaft part **10**, in the usual way is rectangular in cross section and may even in a very advantageous form have a squared cross section. The bit holder part is formed from an enlargement in the same piece as the shaft **10**, and preferably but not necessarily is of the same thickness as that of the shaft **10**. This enlarged part thus consists in the first place of an outstanding part **12** on the side of the shaft which is not intended to carry the bit. The outstanding part **12** is intended, by its mass, to damp the tendency of vibrations, and for that reason the outstanding part is not completely rectangular but preferably rather trapezoidal. On each side a trapezoidal angle is provided, which has, in the illustrated form, been chosen as 2°. Inwardly, a sector formed recess is limited by a circular line **13**, which has its centre at the point or in the immediate proximity of the point where the edge of the mounted bit will be located.

However, such rounding or filleting is of course not required at the end of the holder shaft **10**.

In the corner of the bit holder part **11**, where the steel should be attached, the rounding or filleting **14** is planed out and somewhat larger than in the remaining corners. Perpendicular to this planed cavetto **14** a conical hole **15** runs into the thinner part **16** of the holder. This hole is intended to receive a corresponding conical shaft of the bit, as will be further described below. Perpendicular to the hole **15** runs a further hole **17** for a purpose which will be described further below. This hole, in essence, is for releasing the bit or tip.

The bit or tip consists of a head which is triangular in cross section and an integral shaft. The shaft **18** is attached to one side of the triangular head **19**, so that it runs substantially perpendicular to this side. The opposite corner **20** forms the cutting edge of the bit or tip.

To mount the bit in the holder, one has to insert the conical shaft **18** of the bit in the hole **15** of the holder, which is made with the same degree of conicity, whereafter the bit is turned in such a way that it will at least approximately be positioned with its edge **20** perpendicular to the plane of the paper in FIG. 1. This turning setting is, however, in no way critical, because one of the advantageous properties according to the invention is that the bit will automatically adjust itself, when used, with the edge in the correct direction. Simultaneously the bit is pressed with its shaft **18** into the conical hole **15**, so that a sure and reliable attachment is ensured between the bit and the holder.

In the view in which the head **19** of the bit is shown in FIG. 3, it is, as mentioned above, formed like a triangle. In the view in which the head **19** of the bit is shown in FIG. 4, on the contrary, it is trapezoidal with the greater parallel side being with the edge **20**. This arrangement has been made in order to get a good release of the chips or shavings.

When used the bit is wedged so rigidly into the holder that it is, as a rule, very difficult afterwards to release the bit from the holder, when for instance the bit should be ground anew, or when one wants to exchange the bit for another one, or when one will use the same holder for a bit of another edge length. Then one has to place a conically formed pin into the hole **17**. By a light blow by means of a hammer on the free end of this pin, one may then release the bit. The provision for this, of course, is that the shaft **18** of the steel **18** has such a length that its end will be within the opening of the hole **17** in its working position.

FIGS. 5 and 6 show another form of the bit. According to these figures the head is indicated by **19** and the shaft connected to this head is indicated by **18**. The piece from which this bit was initially produced was conical, but it has been subjected to a grinding operation so that two sides **21** and **22** like facets have been formed, which, between themselves, enclose the edge **20**.

In tests which have been made, it has been proved that one may in the above mentioned way provide a bit holder and a groove cutting bit which are effective in that they are practically completely free of vibrations, but nevertheless they provide for rigid positioning of the proper bit. Further, the holder may satisfy all of the above especially mentioned demands on properties.

The invention, of course, is not limited to the specific form of execution thereof, described above and shown in the drawing, but all different kinds of modifications may occur within the frame of the invention.

What is claimed is:

1. A high speed cutting element for use in cutting grooves with a lathe, comprising: a bit holder; a cutting bit having a head, which carries a cutting edge, and a shaft integral with said head, said shaft being releasibly carried by said holder; said holder comprising a shaft

portion and a main body portion integral therewith, said main body portion being located at and formed in part by one end of the shaft portion and comprising an enlarged portion of substantially the same thickness as the shaft portion but of a substantially greater width, which greater width is formed as a projection on one side of the main body portion; means formed at the extreme end of the main body portion relatively away from the shaft portion and on the side of the main body portion removed from said projection for releasibly holding the cutting bit; a sector shaped recess in said main body portion formed in planes substantially parallel to the plane of said projection of excess width, said recess extending through only a part of the thickness of said main body portion so as to leave a plate-like portion of thickness substantially equal to the length of the cutting edge of said cutting bit; said means for releasibly holding said bit being formed at a corner of said plate-like portion and comprising a conical hole to receive the shaft of the bit, wherein the shaft of the bit is of corresponding conicity, and wherein said hole extends at an angle of substantially 45° to the axis of the shaft portion of the holder.

2. Apparatus as set forth in claim 1 wherein said projection is trapezoidal when viewed normally to its plane, the sides of the projection which run in the direction of the shaft being parallel to each other, and the sides of the projection which run transversely of the shaft are angled toward each other in moving away from the shaft.

3. Apparatus as set forth in claim 2 wherein said sides which are angled toward each other are angled toward each other by angles of 2°.

4. Apparatus as set forth in claim 1 further comprising a second hole in said plate-like portion extending perpendicular to and intersecting said conical hole.

5. A high speed cutting element for use in cutting grooves with a lathe, comprising: a bit holder; a cutting bit releasibly carried by said holder; said holder comprising a shaft portion and a main body portion integral therewith, said main body portion being located at and formed in part by one end of the shaft portion and comprising an enlarged portion of substantially the same thickness as the shaft portion but of a substantially greater width, which greater width is formed as a projection on one side of the main body portion; means formed at

the extreme end of the main body portion relatively away from the shaft portion and on the side of the main body portion removed from said projection for releasibly holding the cutting bit; a sector shaped recess in said main body portion formed in planes substantially parallel to the plane of said projection of excess width, said recess extending through only a part of the thickness of said main body portion so as to leave a plate-like portion of thickness substantially equal to the length of the cutting edge of said cutting bit; said means for releasibly holding said bit being formed at a corner of said plate-like portion; the inner wall of said recess being formed along a circular path having its center located substantially in alignment with the cutting edge of said bit; said cutting bit being triangular in cross section when viewed parallel to its cutting edge, the bit having a shaft which is connected to one of the triangular sides, the apex opposite the shaft bit being the cutting edge of the bit, said shaft releasibly engaging in a hole in said plate-like portion to provide for said releasable holding means.

6. Apparatus as set forth in claim 5 wherein said bit is trapezoidal in cross section when viewed normal to a plane which passes through the cutting edge and the shaft of the bit.

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